POSSIBL : ROLE OF SOAP STRENGTH ON MECHANICAL STABILI1 Y AND OTHER PROPERTIES OF LOW QUALITY LA-TZ NATURAL RUBBER LATEX CONCENTRATE

by

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DECLARATION

I hereby declare that this submission is a result of a work carried out by me and to the best of my knowledge, it contain no material previously written or published by another person nor material which has been accepted for the award of any degree or acceptable qualification of a university, or other Institute of higher learning, except where the due reference to the material is made.

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ABSTRACT

Ever-growing impact of rubber and its products form an inseparable and integral part in human life. But today, rubber industries suffer from lack of quality latex for production. Over the last few decades, various efforts have been carried out to study the ability of Fatty Acid soaps to enhance stability of latex upon mechanical forces. However, an investigation has never been carried out in Sri Lanka on property variation of low quality latex upon soap addition. This study was undertaken with the view to fulfill this requirement. Current study consists of determination of MST and other properties of low quality latex and brief investigation on anti foaming behaviour of phenol on latex base.

Latex was obtained with absence of added soap on a special request from centrifuge plant of Lalan group. They were collected from small holders of Matale, which represents the non-specific climatic conditions for latex production. Soap was added in different strengths at different maturity times. Following properties were investigated at intervals; MST, KOH number, Viscosity, Foaming Height, and Conductivity. Anti-foaming behaviour of phenol on latex base was determined.

Results of this study provide information of low quality latex upon soap addition and aging. Out of entire investigated properties response to the soap was remarkable in MST and Foaming Height upon aging. Viscosity showed great variation within 3 weeks maturation. Prevalence of soap was critical between soap levels of 4.2×10^{-4} and 5.0×10^{-4} moles per 100g of latex. Results suggest that the system attain to critical micelle concentration within this range.

Minimum soap level that is necessary to create observable change in MST and Foaming Height lies between 0.5×10^{-4} and 0.84×10^{-4} moles per100g latex. Soap level of 0.5×10^{-4} makes great variations in Viscosity, Conductivity and KOH No. Effect of soap on Conductivity and KOH No diminishes after 8.41×10^{-4} moles of soap. Both

properties are responsible for the total molecules that are present in the ionized form and not the total molecules in the medium. Since, the soap effect upon KOH No diminishes after certain soap level it cannot be used as an identification of soap addition to latex. However added soap can be identified by variation in the Foaming Height. Significant relationship between soap addition and foaming height reveals that the foreign soap molecules increase the froth formation in latex.

Phenol addition can reduce the foaming in latex. But it reduces the MST of the latex and hence detrimental for the quality of latex.

Variation in MST and Viscosity by deliberate soap addition primarily causes by Fatty Acid soap ions that are adsorbed at the particle surfaces. Variations in KOH No, Conductivity and Foaming Height has brought about by consequent changes taking place in the medium.

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Ca	- Calcium
CO_2	- Carbon Dioxide
CO_3^{-2}	- Carbonate ion
cp(s)	- Centipoises
DRC	- Dry Rubber Content
FA(s)	- Fatty Acid(s)
F.H	- Foaming Height
HA	- High Ammonia
HCO_3^-	- Bicarbonate ion
HFA	- Higher Fatty Acid(s)
Int'l	- International
IRSG	- International Rubber Study Group
LA	- Low Ammonia
LATZ	- Low ammonia latex preserved with ZnO and TMTD
K/K^+	- Potassium/Potassium ion
KOH No	- Potassium Hydroxide number
Mg/Mg^{2+}	- Magnesium/Magnesium ion
MRPRA	- Malaysian Rubber Producers Research Association
MST	- Mechanical Stability Time
MS	- Mechanical Stability
mS	- Milliseiman
No	- Number
Na/Na^+	- Sodium/Sodium ion
NCRT	- National College of Rubber Technology
NH_4OH	- Ammonium Hydroxide
NRL	- Natural Rubber Latex
O_2	- Oxygen
RRIM	- Rubber Research Institute of Malaysia
VFA	- Volatile Fatty Acid
TMTD	- Tetra Methyl Thiuram Disulphide
TSC	- Total Solid Content
ZnO	- Zinc Oxide